

In the Claims:

1. -5 (Cancelled)

6. (Currently Amended) A network configuration data management system comprising:

(a) a directory server including:

(a1) a current map tree for containing information for current network configuration conditions organized into a directory tree format, and

5 (a2) a temporary map tree for containing differential information for a future network configuration organized into a directory tree structure that represents a difference resulting from any changes made to the current network configuration; and

(b) a network configuration information management apparatus including:

10 (b1) network configuration data control means that responds to a request from any external application for providing network configuration data management functions by performing operations on map data,

(b2) current map tree access means for accessing said current map tree within said directory server to retrieve appropriate information therefrom, and updating the retrieved information, and

15 (b3) temporary map tree access means for accessing said temporary map tree within said directory server to perform generating, modifying and deleting operations, wherein

20 a future network configuration information that represents the information expected to occur at any future time later than the current time may be generated by merging the information in said current map tree together with the information in said temporary map tree; and

wherein said network configuration information management apparatus includes a network configuration data store section for storing the directory tree information temporarily; ~~The network configuration data management system as defined in Claim 5,~~

25 wherein said network configuration ~~data~~ information control means is configured for;  
accessing said current map tree containing the current network configuration information through said current map tree access means, and retrieving the information for

the component as identified by an entry located under the current map entry from said current map tree;

temporarily storing the information thus retrieved in said network configuration data store section;

accessing said temporary map tree through said temporary map tree access means, and searching said temporary map tree for any temporary map entry information applicable to the time earlier than the time specified by said external application; wherein

if it is found that no such temporary map entry is available, meaning that the information retrieved from the current map entry is determined to be ~~at~~ the search result, returning the current map entry information to said external application as it remains unchanged, and if it is found that one or more such temporary map entries are available, collects every entry information located under the temporary map entry and specified by said external application that has been retrieved from said temporary map tree through said temporary map tree access means, and

wherein said network configuration data control means is further configured for; merging the entry information under the temporary map entry and collected together with the current map tree previously stored in said network configuration data store means; and

collecting all temporary map entries and ~~merging~~ merges them to update the entry information under the current map entry and stored in said network configuration data store ~~section means~~, and returning the updated version of the information to said external application.

7. (Currently Amended) A network configuration data management system comprising:

(a) a directory server including:

(a1) a current map tree for containing information for current network configuration conditions organized into a directory tree format, and

(a2) a temporary map tree for containing differential information for a future network configuration organized into a directory tree structure that represents a difference resulting from any changes made to the current network configuration; and

(b) a network configuration information management apparatus including:

(b1) network configuration data control means that responds to a request from any  
10 external application for providing network configuration data management functions by  
performing operations on map data,

(b2) current map tree access means for accessing said current map tree within said  
directory server to retrieve appropriate information therefrom, and updating the retrieved  
information, and

15 (b3) temporary map tree access means for accessing said temporary map tree  
within said directory server to perform generating, modifying and deleting operations,  
wherein

a future network configuration information that represents the information expected to  
occur at any future time later than the current time may be generated by merging the  
20 information in said current map tree together with the information in said temporary map  
tree; The network configuration data management system as defined in Claim 3,

wherein

said directory server includes a log map tree for storing the log information that  
occurred in the past for a particular component; and

25 said network configuration information management apparatus includes log map tree  
access means that allows said apparatus to access the log map tree, and

wherein

if the network configuration information that may be applicable to any past time is  
requested, said network configuration data control means responds to that request for causing  
30 said map tree access means and said log map tree access means to accessing said current map  
tree and said log map tree within said directory server, respectively, and retrieve the  
information from the respective map trees, and for obtaining the past network configuration  
information by merging the information retrieved from the current map tree together with the  
log map information that has been setup up to said any past time.

8.-9. (Cancelled)

10. (Currently Amended) In a system comprising a network configuration information management apparatus, the network configuration information management apparatus including:

(a) a directory server for storing a current map tree that contains information for  
5 current network configuration conditions organized into a directory tree structure and a temporary map tree that contains future configuration information, organized into a directory tree structure, that represents a difference from the current network configuration resulting from any changes made to the current network configuration;

(b) network configuration data control means for providing the network configuration  
10 data management functions by performing operations on the map data in response to a request from any external application;

(c) current map tree access means for accessing the current map tree stored in said directory server to retrieve the information therefrom, and updating the retrieved information; and

(d) a temporary map tree access means for accessing the temporary map tree stored in  
15 said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

(A1) receiving, at said network configuration data control means, a request for  
modifying configuration data from any external application, said network configuration data  
20 control means responding to the request to request that the temporary map tree access means generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

(A2) sorting data instructed in the request, termed as "request data", for modifying the  
25 configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

(A4) dividing the processing steps into add, modify and delete, based on the results of  
30 the checking,

(A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

(A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

35 (A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree.

11. (Currently Amended) The network configuration data management method as defined in Claim 10, wherein the step of generating an entry designated as Add in the temporary map tree includes the steps of:

5 (B1) extracting an appropriate identifier identifying the location of entry in said directory tree from an identifier contained in the retrieved request data;

(B2) based on the extracted identifier, checking whether a parent entry for the entry designated as Add already exists in said temporary map tree;

10 (B3) if it is determined that the parent entry does not exist, causing said network configuration data control means to access said directory server through said current map tree access means and retrieve a parent entry information that resides in said current map tree stored in said directory server;

15 (B4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry exists in said current map tree, requiring no modification, when said temporary map tree is merged together with said current map tree, said temporary map tree access means bypasses the generating step, setting a value for the type of operation that is one attribute of the parent entry in ~~the~~ a directory class under the map to "Not Applicable (N/A)"; and

20 (B5) generating the entry designated as Add in the request, and adding the entry under the parent entry generated through said temporary map tree access means, wherein when said temporary map tree is merged together with said current map tree, the attribute value for the operation type in the directory class under the tree is set to "Add" to indicate that ~~said a~~ a new entry should be added in said current map tree.

12. (Original) The network configuration data management method as defined in Claim 10, wherein the step of generating an entry designated as Modify in the temporary map tree includes the steps of:

(C1) retrieving the appropriate identifier identifying the location of entry in said  
5 directory tree from identifiers contained in the retrieved request data;

(C2) based on the retrieved identifier, checking whether the parent entry for the entry designated as Modify already exists in said temporary map tree;

(C3) if it is determined that the parent entry does not exist, causing said network configuration data control means to access said directory server through said current map tree  
10 access means and retrieve the parent entry information that resides in said current map tree stored in said directory server;

(C4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry exists in said current map tree, requiring no modification, at the time when said temporary map tree is merged together with said  
15 current map tree, said temporary map tree access means bypasses the generating step, setting a value for the operation type that is one attribute of the parent entry in the directory class under the map to "Not Applicable (N/A)"; and

(C5) generating an entry designated as Modify in the request data, and adding the entry under the parent entry generated through said temporary map tree access means,  
20 wherein when said temporary map tree is merged together with said current map tree, the attribute value for the operation type in the directory class under the map tree is set to "Modify" to indicate that said existing entry should be modified in said current map tree.

13. (Original) The network configuration data management method as defined in Claim 10, wherein the step of generating an entry designated as Delete in the temporary map tree includes the steps of:

(D1) retrieving the appropriate identifier identifying the location of entry in said  
5 directory tree from the identifiers contained in the retrieved request data;

(D2) based on the retrieved identifier, checking whether the parent entry for the entry designated as Delete already exists in said temporary map tree;

(D3) if it is determined that the parent entry does not exist, causing said network configuration data control means to access said directory server through said current map tree access means and retrieve the parent entry information that resides in said current map tree stored in said directory server;

(D4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry exists in said current map tree, requiring no modification, at the time when said temporary map tree is merged together with said current map tree, said temporary map tree access means bypasses the generating step, setting the value for the operation type that is one attribute of the parent entry in the directory class under the map to "Not Applicable (N/A)"; and

(B5) generating the entry designated as Modify as requested, and adding the entry under the parent entry generated through said temporary map tree access means, wherein when said temporary map tree is merged together with said current map tree, the attribute value for the operation class in the directory class under the tree is set to "Delete" to indicate that said existing entry should be deleted in said current map tree.

14. (Currently Amended) The network configuration data management method as defined in Claim 10, further including the step of updating the current map tree stored in said directory server to a new version by merging said current map tree and said temporary map tree, and wherein said network configuration data control means performs the steps of:

(E1) collecting, through said temporary map tree access means, information for those ones of the entries located under temporary map tree being merged, and that are designated as Delete, Modify or Add;

(E2) determining how many entries have been collected, wherein if it is determined that the number of entries collected is equal to zero, the process is ended, and if it is determined that the number of entries collected is equal to one or more,

(E3) deleting, through said current map tree access means, the entry or entries designated as Delete from the current map tree;

(E4) modifying, through said current map tree access means, the entry or entries designated as Modify in said current map tree;

15 (E5) adding, through said current map tree access means, the entry or entries designated as Add to the current map tree; and

(E6) when the merge processing for all of the entries designated as Delete, Modify and Add under the temporary map tree has been completed, writing the completion time into the an appropriate temporary map entry through said temporary map tree access means.

20 15. (Currently Amended) In a system comprising a network configuration information management apparatus, the network configuration information management apparatus including:

5 (a) a directory server for storing a current map tree that contains information for current network configuration conditions organized into a directory tree structure and a temporary map tree that contains future configuration information, organized into a directory tree structure, that represents a difference from the current network configuration resulting from any changes made to the current network configuration;

10 (b) network configuration data control means for providing the network configuration data management functions by performing operations on map data in response to a request from any external application;

(c) current map tree access means for accessing the current map tree stored in said directory server to retrieve the information therefrom, and updating the retrieved information; and

15 (d) a temporary map tree access means for accessing the temporary map tree stored in said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

20 (A1) receiving, at said network configuration data control means, a request for modifying configuration data from any external application, said network configuration data control means responding to the request to request that the temporary map tree access means generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;



(A2) sorting data instructed in the request, termed as "request data", for modifying the configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

(A4) dividing processing steps into add, modify and delete, based on the results of the checking,

(A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

(A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

wherein said network configuration data management method further including the step of updating the current map tree stored in said directory server to a new version by merging said current map tree and said temporary map tree, and wherein said network configuration data control means performs the steps of:

(E1) collecting, through said temporary map tree access means, information for those ones of the entries located under temporary map tree being merged, and that are designated as Delete, Modify or Add;

(E2) determining how many entries have been collected, wherein if it is determined that the number of entries collected is equal to zero, the process is ended, and if it is determined that the number of entries collected is equal to one or more,

(E3) deleting, through said current map tree access means, the entry or entries designated as Delete from the current map tree;

(E4) modifying, through said current map tree access means, the entry or entries designated as Modify in said current map tree;

(E5) adding, through said current map tree access means, the entry or entries designated as Add to the current map tree; and

(E6) when the merge processing for all of the entries designated as Delete, Modify and Add under the temporary map tree has been completed, writing the completion time into

55 an appropriate temporary map entry through said temporary map tree access means; and

~~The network configuration data management method as defined in Claim 14,~~

wherein when it is determined that one or more entries located under the temporary map tree are to be deleted, the step (E3) further including causing said network configuration data control means to perform the steps of:

60 extracting the identifier for the appropriate entry from the information for the entry designated as Delete under the temporary map tree and collected through said temporary map tree access means;

translating the extracted identifier into an identifier for the corresponding entry designated as Delete under the current map tree;

65 deleting, through said current map tree access means, the entry under the current map tree by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be deleted.

16.(Currently Amended) In a system comprising a network configuration information management apparatus, the network configuration information management apparatus including:

5 (a) a directory server for storing a current map tree that contains information for current network configuration conditions organized into a directory tree structure and a temporary map tree that contains future configuration information, organized into a directory tree structure, that represents a difference from the current network configuration resulting from any changes made to the current network configuration;

10 (b) network configuration data control means for providing the network configuration data management functions by performing operations on map data in response to a request from any external application;

(c) current map tree access means for accessing the current map tree stored in said directory server to retrieve the information therefrom, and updating the retrieved information; and

15 (d) a temporary map tree access means for accessing the temporary map tree stored in said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

(A1) receiving, at said network configuration data control means, a request for modifying configuration data from any external application, said network configuration data control means responding to the request to request that the temporary map tree access means  
20 generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

(A2) sorting data instructed in the request, termed as "request data", for modifying the  
25 configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

(A4) dividing processing steps into add, modify and delete, based on the results of the  
30 checking;

(A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

(A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

35 (A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

wherein said network configuration data management method further including the step of updating the current map tree stored in said directory server to a new version by merging said current map tree and said temporary map tree, and wherein said network  
40 configuration data control means performs the steps of:

(E1) collecting, through said temporary map tree access means, information for those ones of the entries located under temporary map tree being merged, and that are designated as Delete, Modify or Add;

(E2) determining how many entries have been collected, wherein if it is determined  
45 that the number of entries collected is equal to zero, the process is ended, and if it is  
determined that the number of entries collected is equal to one or more,

(E3) deleting, through said current map tree access means, the entry or entries  
designated as Delete from the current map tree;

(E4) modifying, through said current map tree access means, the entry or entries  
50 designated as Modify in said current map tree;

(E5) adding, through said current map tree access means, the entry or entries  
designated as Add to the current map tree; and

(E6) when the merge processing for all of the entries designated as Delete, Modify  
and Add under the temporary map tree has been completed, writing the completion time into  
55 an appropriate temporary map entry through said temporary map tree access means; and  
The network configuration data management method as defined in Claim 14,

wherein when it is determined that one or more entries located under the temporary  
map tree are to be modified, the step (E4) further including causing said network  
configuration data control means to perform the steps of:

60 extracting an identifier for the appropriate entry from the information for the entry  
designated as Modify under the temporary map tree and collected through said temporary  
map tree access means;

translating the extracted identifier into an identifier for the corresponding entry  
designated as Modify under the current map tree;

65 generating a parameter that specifies that the entry is to be modified;  
modifying, through said current map tree access means, the entry located under the  
current map tree by using the translated identifier as a parameter; and  
repeating the preceding steps until there are no more entries that are to be modified.

17.(Currently Amended) In a system comprising a network configuration information  
management apparatus, the network configuration information management apparatus  
including:

(a) a directory server for storing a current map tree that contains information for  
5 current network configuration conditions organized into a directory tree structure and a

temporary map tree that contains future configuration information, organized into a directory tree structure, that represents a difference from the current network configuration resulting from any changes made to the current network configuration;

\_\_\_\_\_ (b) network configuration data control means for providing the network configuration data management functions by performing operations on map data in response to a request from any external application;

\_\_\_\_\_ (c) current map tree access means for accessing the current map tree stored in said directory server to retrieve the information therefrom, and updating the retrieved information; and

\_\_\_\_\_ (d) a temporary map tree access means for accessing the temporary map tree stored in said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

\_\_\_\_\_ (A1) receiving, at said network configuration data control means, a request for modifying configuration data from any external application, said network configuration data control means responding to the request to request that the temporary map tree access means generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

\_\_\_\_\_ (A2) sorting data instructed in the request, termed as "request data", for modifying the configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

\_\_\_\_\_ (A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

\_\_\_\_\_ (A4) dividing processing steps into add, modify and delete, based on the results of the checking,

\_\_\_\_\_ (A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

\_\_\_\_\_ (A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

\_\_\_\_\_ (A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

wherein said network configuration data management method further including the step of updating the current map tree stored in said directory server to a new version by merging said current map tree and said temporary map tree, and wherein said network configuration data control means performs the steps of:

(E1) collecting, through said temporary map tree access means, information for those ones of the entries located under temporary map tree being merged, and that are designated as Delete, Modify or Add;

(E2) determining how many entries have been collected, wherein if it is determined that the number of entries collected is equal to zero, the process is ended, and if it is determined that the number of entries collected is equal to one or more,

(E3) deleting, through said current map tree access means, the entry or entries designated as Delete from the current map tree;

(E4) modifying, through said current map tree access means, the entry or entries designated as Modify in said current map tree;

(E5) adding, through said current map tree access means, the entry or entries designated as Add to the current map tree; and

(E6) when the merge processing for all of the entries designated as Delete, Modify and Add under the temporary map tree has been completed, writing the completion time into an appropriate temporary map entry through said temporary map tree access means; and

~~The network configuration data management method as defined in Claim 14,~~

wherein when it is determined that one or more entries located under the temporary map tree are to be added, the step (E5) further including causing said network configuration data control means to perform the steps of:

extracting the identifier for the appropriate entry from the information for the entry designated as Add under the temporary map tree and collected through said temporary map tree access means;

translating the extracted identifier into an identifier for a corresponding entry designated as Add under the current map tree;

generating a parameter that specifies that the entry is to be added;

adding, through said current map tree access means, the entry under the current map tree by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be added.

18. (Original) The network configuration data management method as defined in Claim 10, wherein said network configuration information management apparatus further includes a network configuration data store section for storing the directory tree information temporarily, and wherein the method further includes a step of causing said network

5 configuration data control means to perform the steps of:

retrieving, through said current map tree access means, information for a component as specified by the entry under the current map tree and containing the current network configuration information;

10 storing the retrieved information for said network configuration data store section temporarily;

searching for information for appropriate entries under the current map tree applicable to any particular time earlier than a time specified by said external application;

15 if it is determined that the number of temporary map entries collected is equal to zero, which means that the information obtained from the entries under the current map tree may be used, returning that information to said external application as it remains unchanged;

if it is determined that the number of temporary map entries collected is equal to one or more, collecting the information for each of the entries under the temporary map tree as specified by said external application and retrieved through said temporary map tree access means;

20 merging the collected entry information under the temporary map tree together with the current map tree previously stored in said network configuration data store section;

merging all of the temporary map entries collected to update the information under the current map tree stored in the network configuration data store section; and

returning the updated information to said external application.

25 19. (Currently Amended) The network configuration data management method as defined in Claim 10, wherein

said directory server further includes a log map tree for storing log information for components that occurred in the past; and

5        said network configuration information data management apparatus further includes a  
log map tree access means through which it has access to said log map tree, and wherein  
in response to the request for the network configuration information that is applicable  
to any particular time in the past, said network configuration data control means obtains the  
information in the current map tree stored in said directory server as well as the information  
10 in said log map tree, through said current map tree access means and said log map tree access  
means, respectively, and then produces a new version of the network configuration  
information as requested by merging the information in said map tree together with the  
information in said log map tree that has been setup up to said particular past time.

20. (Currently Amended) In a system comprising a network configuration information  
management apparatus, the network configuration information management apparatus  
including:

5        (a) a directory server for storing a current map tree that contains information for  
current network configuration conditions organized into a directory tree structure and a  
temporary map tree that contains future configuration information, organized into a directory  
tree structure, that represents a difference from the current network configuration resulting  
from any changes made to the current network configuration;

10        (b) network configuration data control means for providing the network configuration  
data management functions by performing operations on map data in response to a request  
from any external application;

15        (c) current map tree access means for accessing the current map tree stored in said  
directory server to retrieve the information therefrom, and updating the retrieved information;  
and

20        (d) a temporary map tree access means for accessing the temporary map tree stored in  
said directory server, and generating, modifying and updating the information therein, a  
network configuration data management method comprising the steps of:

20        (A1) receiving, at said network configuration data control means, a request for  
modifying configuration data from any external application, said network configuration data  
control means responding to the request to request that the temporary map tree access means  
generate a temporary map entry as a root for the temporary map tree, and said temporary map



tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

\_\_\_\_\_ (A2) sorting data instructed in the request, termed as "request data", for modifying the configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

\_\_\_\_\_ (A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

\_\_\_\_\_ (A4) dividing processing steps into add, modify and delete, based on the results of the checking,

\_\_\_\_\_ (A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

\_\_\_\_\_ (A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

\_\_\_\_\_ (A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

\_\_\_\_\_ wherein

\_\_\_\_\_ said directory server further includes a log map tree for storing log information for components that occurred in the past; and

\_\_\_\_\_ said network configuration information management apparatus further includes a log map tree access means through which it has access to said log map tree, and wherein

\_\_\_\_\_ in response to the request for the network configuration information that is applicable to any particular time in the past, said network configuration data control means obtains the information in the current map tree stored in said directory server as well as the information in said log map tree, through said current map tree access means and said log map tree access means, respectively, and then produces a new version of the network configuration information as requested by merging the information in said map tree together with the information in said log map tree that has been setup up to said particular past time; The network configuration data management method as defined in Claim 19;

\_\_\_\_\_ and wherein if there are one or more entries under the temporary map tree that are to be deleted at the time when the entries under the current map tree are being deleted, the

method further includes the step of causing said network configuration data control means to perform the steps of:

extracting an identifier for an appropriate entry from the information for the entry  
55 designated as Delete under the temporary map tree and collected through said temporary map tree access means;

translating the retrieved entry identifier into an identifier for the corresponding entry designated as Delete under the current map tree;

generating an entry designated as Added under the log map through said log map tree  
60 access means;

deleting the entry under the current map tree through said current map tree access means by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be deleted.

21. (Currently Amended) In a system comprising a network configuration information management apparatus, the network configuration information management apparatus including:

(a) a directory server for storing a current map tree that contains information for  
5 current network configuration conditions organized into a directory tree structure and a temporary map tree that contains future configuration information, organized into a directory tree structure, that represents a difference from the current network configuration resulting from any changes made to the current network configuration;

(b) network configuration data control means for providing the network configuration  
10 data management functions by performing operations on map data in response to a request from any external application;

(c) current map tree access means for accessing the current map tree stored in said  
directory server to retrieve the information therefrom, and updating the retrieved information;  
and

15 (d) a temporary map tree access means for accessing the temporary map tree stored in said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

(A1) receiving, at said network configuration data control means, a request for modifying configuration data from any external application, said network configuration data control means responding to the request to request that the temporary map tree access means generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

(A2) sorting data instructed in the request, termed as "request data", for modifying the configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

(A4) dividing processing steps into add, modify and delete, based on the results of the checking,

(A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

(A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

wherein

said directory server further includes a log map tree for storing log information for components that occurred in the past; and

said network configuration information management apparatus further includes a log map tree access means through which it has access to said log map tree, and wherein

in response to the request for the network configuration information that is applicable to any particular time in the past, said network configuration data control means obtains the information in the current map tree stored in said directory server as well as the information in said log map tree, through said current map tree access means and said log map tree access means, respectively, and then produces a new version of the network configuration information as requested by merging the information in said map tree together with the

information in said log map tree that has been setup up to said particular past time;The  
network configuration data management method as defined in Claim 19;

50        wherein if there are one or more entries under the temporary map tree that are to be  
modified at the time when the entries under the current map tree are being modified, the  
method further includes a step of causing said network configuration data control means to  
perform the steps of:

      extracting an identifier for an appropriate entry from the information for entry  
55 designated as Modify under the temporary map tree and collected through said temporary  
map tree access means;

      translating the retrieved entry identifier into an identifier for a corresponding entry  
designated as Modify under the current map tree;

      generating a parameter that specifies that the entry is to be modified;

60        generating an entry designated as Modify under the log map through said log map tree  
access means;

      modifying the entry under the current map tree through said current map tree access  
means by using the translated identifier as a parameter; and

      repeating the preceding steps until there are no more entries that are to be modified.

65

22. (Currently Amended) In a system comprising a network configuration information  
management apparatus, the network configuration information management apparatus  
including:

5        (a) a directory server for storing a current map tree that contains information for  
current network configuration conditions organized into a directory tree structure and a  
temporary map tree that contains future configuration information, organized into a directory  
tree structure, that represents a difference from the current network configuration resulting  
from any changes made to the current network configuration;

10        (b) network configuration data control means for providing the network configuration  
data management functions by performing operations on map data in response to a request  
from any external application;

(c) current map tree access means for accessing the current map tree stored in said directory server to retrieve the information therefrom, and updating the retrieved information; and

15 (d) a temporary map tree access means for accessing the temporary map tree stored in said directory server, and generating, modifying and updating the information therein, a network configuration data management method comprising the steps of:

(A1) receiving, at said network configuration data control means, a request for modifying configuration data from any external application, said network configuration data control means responding to the request to request that the temporary map tree access means  
20 generate a temporary map entry as a root for the temporary map tree, and said temporary map tree access means responding to the request from said network configuration data control means to access said directory server for generating the temporary map entry;

(A2) sorting data instructed in the request, termed as "request data", for modifying the  
25 configuration data for each entry, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving said sorted data in the request sequentially, and checking them to determine whether what is requested is to add, modify, or delete an entry;

(A4) dividing processing steps into add, modify and delete, based on the results of the  
30 checking,

(A5) if it is determined that an entry is to be added, generating an entry designated as Add in the temporary map tree;

(A6) if it is determined that any existing entry is to be modified, generating an entry designated as Modify in the temporary map tree; and

35 (A7) if it is determined that the information for any existing entry is to be deleted, generating an entry designated as Delete in the temporary map tree;

wherein

said directory server further includes a log map tree for storing log information for components that occurred in the past; and

40 said network configuration information management apparatus further includes a log map tree access means through which it has access to said log map tree, and wherein

in response to the request for the network configuration information that is applicable to any particular time in the past, said network configuration data control means obtains the information in the current map tree stored in said directory server as well as the information in said log map tree, through said current map tree access means and said log map tree access means, respectively, and then produces a new version of the network configuration information as requested by merging the information in said map tree together with the information in said log map tree that has been setup up to said particular past time; The network configuration data management method as defined in Claim 19;

wherein if there are one or more entries under the temporary map tree that are to be added at the time when the entries under the current map tree are being added, the method further includes the step of causing said network configuration data control means to perform the steps of:

extracting the identifier for the appropriate entry from the information for the entry designated as Add under the temporary map tree and collected through said temporary map tree access means;

translating the extracted identifier into an identifier for a corresponding entry designated as Add under the current map tree;

generating a parameter that specifies that the entry is to be added;

generating an entry designated as Add under the log map through said log map tree access means;

modifying the entry under the current map tree through said current map tree access means by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be added.

23. (Original) The network configuration data management method as defined in Claim 21, further including the step of causing said network configuration data control means to perform the steps of:

retrieving, through said current map tree access means, the information or attribute value for the entry designated as Add or Modify from the corresponding entry in said current map tree;

extracting the identifier for the appropriate entry from the retrieved information, and  
translating the extracted identifier into the corresponding identifier under the log map tree;  
checking a value for the type of operation;

10 if it is determined that the type of operation is "delete", setting the parameter for the  
entry designated as Add under the log map tree to specify "add" as the type of operation;

if it is determined that the type of operation is "modify", setting the type of operation  
for the entry being generated under the log map tree to "modify";

generating a parameter that specifies that an entry is to be generated under the log  
15 map tree, based on the attribute value collected from the entry under the current map tree; and  
generating the entry in said log map tree within said directory server through said log  
map tree access means.

24.(Original) The network configuration data management method as defined in Claim 21,  
further including a step of causing said network configuration data control means to perform  
the steps of:

extracting an identifier from the information obtained from the entry designated as  
5 Add under the temporary map tree;

translating the extracted identifier into a corresponding identifier for use in generating  
an entry designated as Delete under the log map tree;

setting the parameter for the entry being generated under the log map tree to specify  
"delete" as the type of operation; and

10 generating an entry designated as Delete under said log map tree through said log map  
tree access means.

25. (Original) A computer program for being executed on a computer including a network  
configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition  
5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network  
configuration, organized into a directory tree structure, that represents a difference from a

current network configuration resulting from changes made to the current network configuration;

10           a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

          a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

15           a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

          said computer program comprising the steps of:

          (A1) receiving a request for change in the configuration from an external application,  
20       and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

          (A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

          (A3) retrieving the sorted data in the request sequentially, and determining from the  
25       retrieved data that it requests that an entry is to be added, modified, or deleted;

          (A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

          (A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30           (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

          (A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree.

26. (Currently Amended) The computer program as defined in Claim 25, wherein

          the step of generating an entry designated as Add in the temporary map tree includes the steps of:



(B1) extracting an identifier that indicates the location of entry in said directory tree  
5 from the identifier contained in the retrieved data;

(B2) checking the retrieved identifier to determine whether a parent entry for the entry designated as Add in said temporary map tree has already been generated;

(B3) if it is determined that the parent entry has not already been generated, causing said network configuration data control means to retrieve, through said current map tree  
10 access means, the parent entry information contained in said current map tree;

(B4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry already exists in said current map tree, requiring no modification, said temporary map tree access means sets the attribute value for the type of operation for the parent entry in the directory class under the map to "Not  
15 Applicable" to indicate that the adding process should be bypassed when said temporary map tree is merged together with said current map tree; and

(B5) generating an additional entry designated as Add and contained in the data in the request, under the parent entry generated through said temporary map tree access means, wherein said temporary map tree access means sets an attribute value for the type of  
20 operation in the directory class under the map to "Add" to indicate that anthe appropriate additional entry is to be added in the current map tree when said temporary map tree is merged together with said current map tree.

27. (Original) The computer program as defined in Claim 25, wherein

the step of generating an entry designated as Modify in the temporary map tree includes the steps of:

(C1) extracting an identifier that indicates the location of entry in said directory tree  
5 from identifiers contained in the retrieved request data;

(C2) checking the extracted identifier to determine whether a parent entry for the entry designated as Add in said temporary map tree has already been generated;

(C3) if it is determined that the parent entry has not already been generated, causing said network configuration data control means to retrieve, through said current map tree  
10 access means, the parent entry information contained in said current map tree;

(C4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry already exists in said current map tree, requiring no modification, said temporary map tree access means sets an attribute value for the type of operation for the parent entry in the directory class under the map to "Not  
15 Applicable" to indicate that the modifying process should be bypassed when said temporary map tree is merged together with said current map tree; and

(C5) generating an entry designated as Modify and contained in the data in the request, under the parent entry generated through said temporary map tree access means, wherein said temporary map tree access means sets the attribute value for the type of  
20 operation in the directory class under the map tree to "Modify" to indicate that an appropriate entry located in the current map tree is to be modified when said temporary map tree is merged together with said current map tree.

28. (Currently Amended) The computer program ~~code~~ as defined in Claim 25, wherein the step of generating an entry designated as Delete in the temporary map tree includes the steps of:

(D1) extracting an identifier that indicates the location of entry in said directory tree  
5 from the identifiers contained in the retrieved request data;

(D2) checking the extracted identifier to determine whether the parent entry for the entry designated as Delete in said temporary map tree has already been generated;

(D3) if it is determined that the parent entry has not already been generated, causing said network configuration data control means to retrieve, through said current map tree  
10 access means, the parent entry information contained in said current map tree;

(D4) generating a parent entry under the temporary map entry through said temporary map tree access means, wherein as the parent entry already exists in said current map tree, requiring no modification, said temporary map tree access means sets the attribute value for the type of operation for the parent entry in the directory class under the map to "Not  
15 Applicable" to indicate that the deleting process should be bypassed when said temporary map tree is merged together with said current map tree; and

(D5) generating an entry designated as Delete and contained in the data in the request, under the parent entry generated through said temporary map tree access means, wherein said

temporary map tree access means sets an attribute value for the type of operation in the  
20 directory class under the map to "Delete" to indicate that the appropriate entry located in the  
current map tree is to be deleted when said temporary map tree is merged with said current  
map tree.

29. (Currently Amended) The computer program as defined in Claim 25, wherein further  
including the step of updating the current map tree stored in said directory server to a new  
version by merging said current map tree and said temporary map tree, and wherein said  
network configuration data control means performs the steps of:

5 (E1) collecting, through said temporary map tree access means, information for those  
ones of the entries located under temporary map tree being merged, and that are designated as  
Delete, Modify or Add;

(E2) determining how many entries have been collected, wherein if it is determined  
that the number of entries collected is equal to zero, the process is ended, and if it is  
10 determined that the number of entries collected is equal to one or more,

(E3) deleting, through said current map tree access means, the entry designated as  
Delete from the current map tree;

(E4) modifying, through said current map tree access means, the entry designated as  
Modify in said current map tree;

15 (E5) adding, through said current map tree access means, the entry designated as Add  
to the current map tree; and

(E6) when the merge processing for all of the entries designated as Delete, Modify  
and Add under the temporary map tree has been completed, writing the completion time into  
anthe appropriate temporary map entry through said temporary map tree access means.

20 30.(Currently Amended) A computer program for being executed on a computer including a  
network configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition  
5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a current network configuration resulting from changes made to the current network configuration;

10 a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

15 a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

20 (A1) receiving a request for change in the configuration from an external application, and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

25 (A3) retrieving the sorted data in the request sequentially, and determining from the retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree; ~~The computer program as defined in Claim 25, wherein~~

35 when it is determined that there are one or more entries located under the temporary map tree that are to be deleted, the step (E3) further including causing said network configuration data control means to perform the steps of:

extracting the identifier for the appropriate entry from the information for the entry designated as Delete under the temporary map tree and collected through said temporary map tree access means;

40 translating the extracted identifier into an identifier for the corresponding entry designated as Delete under the current map tree;

deleting, through said current map tree access means, the entry under the current map tree by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be deleted.

45 31. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition  
5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network  
configuration, organized into a directory tree structure, that represents a difference from a  
current network configuration resulting from changes made to the current network  
configuration;

10 a network configuration data control means responsive to a request received from any  
external application for performing operations on the map data and providing network  
configuration data management functions;

a current map tree access means for retrieving and updating the information from the  
current map tree stored in said directory server; and

15 a temporary map tree access means for performing the generating, modifying, and  
deleting operations for the temporary map tree stored in said directory server, the functional  
and processing features of said network configuration data control means,

said computer program comprising the steps of:

(A1) receiving a request for change in the configuration from an external application,  
20 and requesting that the temporary map tree access means access said directory server to  
generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving the sorted data in the request sequentially, and determining from the  
25 retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into  
Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add  
in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as  
Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as  
Delete in the temporary map tree; The computer program for being executed on a computer  
as defined in Claim 25;

35 wherein when it is determined that there are one or more entries located under the  
temporary map tree that are to be modified, the step (E4) further including causing said  
network configuration data control means to perform the steps of:

extracting an identifier for the appropriate entry from the information for the entry  
designated as Modify under the temporary map tree and collected through said temporary  
40 map tree access means;

translating the retrieved identifier into an identifier for the corresponding entry  
designated as Modify under the current map tree;

generating a parameter that specifies that the entry is to be modified;

modifying, through said current map tree access means, the entry under the current  
45 map tree by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be modified.

32. (Currently Amended) A computer program for being executed on a computer including a  
network configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition

5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a current network configuration resulting from changes made to the current network configuration;

10 a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

15 a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

20 (A1) receiving a request for change in the configuration from an external application, and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

25 (A3) retrieving the sorted data in the request sequentially, and determining from the retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree; The computer program as defined in Claim 25, wherein when it is determined that one or more entries located under the temporary map tree that are  
35 to be added, the step (E5) further including causing said network configuration data control means to perform the steps of:

extracting the identifier for the appropriate entry from the information for the entry designated as Add under the temporary map tree and collected through said temporary map tree access means;

40 translating the extracted identifier into an identifier for a corresponding entry designated as Add under the current map tree;

generating a parameter that specifies that the entry is to be added;

modifying, through said current map tree access means, the entry under the current map tree by using the translated identifier as a parameter; and

45 repeating the preceding steps until there are no more entries that are to be added.

33. (Original) The computer program as defined in Claim 25, wherein said network configuration information management apparatus further includes a network configuration data store section for storing the directory tree information temporarily, and wherein the computer program further includes a step of causing said network configuration data control  
5 means to perform the steps of:

retrieving, through said current map tree access means, information for a component as specified by the entry under the current map entry and containing the current network configuration information;

10 storing the retrieved information in said network configuration data store section temporarily;

searching for information for appropriate temporary map entries that is applicable to any particular time earlier than a time specified by said external application;

15 if it is determined that the number of temporary map entries collected is equal to zero, which means that the information under the current map entry that has been obtained may be returned to the external application, returning that information to said external application;

if it is determined that the number of temporary map entries collected is equal to one or more, collecting the information for each of the entries under the temporary map entry as specified by said external application and obtained through said temporary map tree access means;

20 merging the collected entry information under the temporary map entry together with the current map tree previously stored in said network configuration;



merging all of the temporary map entries collected to update the information under the current map entries stored in the network configuration data store section; and returning the updated information to said external application.

25

34. (Original) The computer program as defined in Claim 25, wherein

said directory server further includes a log map tree for storing log information for components that occurred in the past; and

said network configuration information data management apparatus further includes a log map tree access means through which it has access to said log map tree, and wherein

in response to the request for the network configuration information that is applicable to any particular time in the past, said network configuration data control means obtains the information in the current map tree stored in said directory server and the information in said log map tree through said current map tree access means and said log map tree access means, respectively, and obtains the network configuration information as requested by merging the information in said map tree together with the information in said log map tree that has been setup up to said particular past time.

35. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition

organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a current network configuration resulting from changes made to the current network configuration;

a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

15 a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

(A1) receiving a request for change in the configuration from an external application,  
20 and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

(A3) retrieving the sorted data in the request sequentially, and determining from the  
25 retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree; The computer program as defined in Claim 25, wherein if  
there are one or more entries under the temporary map tree that are to be deleted at the time  
35 when the entries under the current map entry are being deleted, the computer program further includes a step of causing said network configuration data control means to perform the steps of:

extracting an identifier for an appropriate entry from the information for the entry designated as Delete under the temporary map tree and collected through said temporary map  
40 tree access means;

translating the extracted identifier into an identifier for the corresponding entry designated as Delete under the current map tree;

generating an entry designated as Add under the log map through said log map tree access means;

- 45 deleting the entry under the current map entry through said current map tree access means by using the translated identifier as a parameter; and
- repeating the preceding steps until there are no more entries that are to be deleted.

36. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

a directory server storing:

- a current map tree that contains information for the current network condition
- 5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a current network configuration resulting from changes made to the current network configuration;

- 10 a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

- 15 a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

- (A1) receiving a request for change in the configuration from an external application,
- 20 and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

- (A3) retrieving the sorted data in the request sequentially, and determining from the
- 25 retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree; ~~The computer program as defined in Claim 25,~~ wherein if there are one or more entries under the temporary map tree that are to be modified at the time  
35 when the entries under the current map tree are being modified, the computer program further includes the step of causing said network configuration data control means to perform the steps of:

extracting the identifier for the appropriate entry from the information for the entry designated as Modify under the temporary map tree and collected through said temporary  
40 map tree access means;

translating the extracted identifier into an identifier for the corresponding entry designated as Modify under the current map tree;

generating a parameter that specifies that the entry is to be modified;

generating an entry designated as Modify under the log map through said log map tree  
45 access means;

modifying the entry under the current map entry through said current map tree access means by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be modified.

37. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

a directory server storing;

a current map tree that contains information for the current network condition  
5 organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a

current network configuration resulting from changes made to the current network configuration;

10 a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

15 a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

20 (A1) receiving a request for change in the configuration from an external application, and requesting that the temporary map tree access means access said directory server to generate a temporary map entry as a root of the temporary map tree;

(A2) sorting the data instructed in the configuration change request, in the order of the directory tree hierarchy beginning with a top level toward a bottom level;

25 (A3) retrieving the sorted data in the request sequentially, and determining from the retrieved data that it requests that an entry is to be added, modified, or deleted;

(A4) based on the result determined in step (A3), dividing the processing steps into Add, Modify and Delete, otherwise treating the request as an error;

(A5) if it is determined that Add is requested, generating an entry designated as Add in the temporary map tree;

30 (A6) if it is determined that Modify is requested, generating an entry designated as Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as Delete in the temporary map tree; The computer program as defined in Claim 25, wherein if there are one or more entries under the temporary map tree that are to be added at the time  
35 when the entries under the current map tree are being added, the computer program code further includes a step of causing said network configuration data control means to perform the steps of:

extracting an identifier for an appropriate entry from the information for the entry designated as Add under the temporary map tree and collected through said temporary map tree access means;

translating the extracted identifier into an identifier for the corresponding entry designated as Add under the current map tree;

generating a parameter that specifies that the entry is to be added;

generating an entry designated as Delete under the log map through said log map tree

access means;

adding the entry under the current map tree through said current map tree access means by using the translated identifier as a parameter; and

repeating the preceding steps until there are no more entries that are to be added.

38. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

a directory server storing:

a current map tree that contains information for the current network condition organized into a directory tree structure, and

a temporary map tree that contains information for the future network configuration, organized into a directory tree structure, that represents a difference from a current network configuration resulting from changes made to the current network configuration;

a network configuration data control means responsive to a request received from any external application for performing operations on the map data and providing network configuration data management functions;

a current map tree access means for retrieving and updating the information from the current map tree stored in said directory server; and

a temporary map tree access means for performing the generating, modifying, and deleting operations for the temporary map tree stored in said directory server, the functional and processing features of said network configuration data control means,

said computer program comprising the steps of:

\_\_\_\_\_ (A1) receiving a request for change in the configuration from an external application,  
20 and requesting that the temporary map tree access means access said directory server to  
generate a temporary map entry as a root of the temporary map tree;

\_\_\_\_\_ (A2) sorting the data instructed in the configuration change request, in the order of the  
directory tree hierarchy beginning with a top level toward a bottom level;

\_\_\_\_\_ (A3) retrieving the sorted data in the request sequentially, and determining from the  
25 retrieved data that it requests that an entry is to be added, modified, or deleted;

\_\_\_\_\_ (A4) based on the result determined in step (A3), dividing the processing steps into  
Add, Modify and Delete, otherwise treating the request as an error;

\_\_\_\_\_ (A5) if it is determined that Add is requested, generating an entry designated as Add  
in the temporary map tree;

30 \_\_\_\_\_ (A6) if it is determined that Modify is requested, generating an entry designated as  
Modify in the temporary map tree; and

\_\_\_\_\_ (A7) if it is determined that Delete is requested, generating an entry designated as  
Delete in the temporary map tree; ~~The computer program as defined in Claim 25, further~~  
including a step of

35 \_\_\_\_\_ causing said network configuration data control means to perform the steps of:

retrieving the information or attribute value for the entry designated as Add or Modify  
from the corresponding entry in said current map tree through said current map tree access  
means;

extracting an identifier for an appropriate entry from the retrieved information, and

40 translating the extracted identifier into a corresponding identifier under the log map tree;

checking the value for the type of operation;

if it is determined that the type of operation is "delete", setting a parameter for the  
entry designated as Add under the log map tree to specify "add" as the type of operation;

if it is determined that the type of operation is "modify", setting the type of operation  
45 for the entry being generated under the log map tree to the value "modify";

generating a parameter for the entry being generated under the log map tree, based on  
an attribute value collected from the entry under the current map tree; and

generating an entry in said log map tree within said directory server through said log  
map tree access means.

39. (Currently Amended) A computer program for being executed on a computer including a network configuration information management apparatus that comprises:

\_\_\_\_\_ a directory server storing;

\_\_\_\_\_ a current map tree that contains information for the current network condition  
organized into a directory tree structure, and

\_\_\_\_\_ a temporary map tree that contains information for the future network  
configuration, organized into a directory tree structure, that represents a difference from a  
current network configuration resulting from changes made to the current network  
configuration;

\_\_\_\_\_ a network configuration data control means responsive to a request received from any  
external application for performing operations on the map data and providing network  
configuration data management functions;

\_\_\_\_\_ a current map tree access means for retrieving and updating the information from the  
current map tree stored in said directory server; and

\_\_\_\_\_ a temporary map tree access means for performing the generating, modifying, and  
deleting operations for the temporary map tree stored in said directory server, the functional  
and processing features of said network configuration data control means,

\_\_\_\_\_ said computer program comprising the steps of:

\_\_\_\_\_ (A1) receiving a request for change in the configuration from an external application,  
and requesting that the temporary map tree access means access said directory server to  
generate a temporary map entry as a root of the temporary map tree;

\_\_\_\_\_ (A2) sorting the data instructed in the configuration change request, in the order of the  
directory tree hierarchy beginning with a top level toward a bottom level;

\_\_\_\_\_ (A3) retrieving the sorted data in the request sequentially, and determining from the  
retrieved data that it requests that an entry is to be added, modified, or deleted;

\_\_\_\_\_ (A4) based on the result determined in step (A3), dividing the processing steps into  
Add, Modify and Delete, otherwise treating the request as an error;

\_\_\_\_\_ (A5) if it is determined that Add is requested, generating an entry designated as Add  
in the temporary map tree;



30        (A6) if it is determined that Modify is requested, generating an entry designated as  
Modify in the temporary map tree; and

(A7) if it is determined that Delete is requested, generating an entry designated as  
Delete in the temporary map tree; The computer program as defined in Claim 25, further  
including a step of

35        causing said network configuration data control means to perform the steps of:

         extracting an identifier for an appropriate entry from the information obtained from  
the entry designated as Add under the temporary map tree;

         translating the extracted identifier into a corresponding identifier for use in generating  
an entry designated as Delete under the log map tree;

40        setting the parameter for the entry being generated under the log map tree to specify  
"delete" as the type of operation; and

         generating an entry designated as Delete under said log map ~~entry~~ through said log  
map tree access means.

45        40-41 (Cancelled)